SUMMARY REPORT
CTC-GEOTEK ENVIRONMENTAL INVESTIGATIONS
KEYSTONE WALLACE PRODUCED
WATER DISPOSAL FACILITY
SECTION 34, T.29 SOUTH, R. 24 EAST
SAN JUAN COUNTY, UTAH

CTC-GEOTEK PROJECT NO. 142104

PREPARED FOR:

GRAND COUNTY COMMISSION

PREPARED BY:

CTC-GEOTEK, INC.
361 IRONWOOD DRIVE
SALT LAKE CITY, UTAH 84115

CTC-GEOTEK

ENGINEERING TESTING INSPECTION

August 6, 1992

Mr. David Knutson
Grand County Commission Chairman
County Court House
Moab, Utah 84532

Attention: Mr. David Knutson

Subject: Summary Report of CTC-Geotek Environmental Investigations
Keystone Wallace Produced Water Disposal Facility
Section 34, T. 29 South, R. 24 East
San Juan County, Utah

CTC-Geotek Project No. 142104

Dear Commissioners:

At the request of you and the Department of Environmental Quality (DEQ), we have completed our subsurface environmental investigations of the subject property or "the Site".

This report summarizes recent data, as well as data presented in previous environmental assessment reports/updates. We have tested for the presence of petroleum hydrocarbons (i.e., TPH and BTEX), volatile organic compounds (VOCs), and metals in both soil and water sampled at the Site which includes the Jerry Holiday property and BLM land. The results are presented herein.

We appreciate the opportunity to be of service to you. Please contact our office if you have questions regarding this project or if we can be of further service.

Sincerely,
CTC-Geotek, Inc.

Jeffrey C. Olson, P.E.
Regional Manager

LVP/HG/JCO:gai

361 IRONWOOD DRIVE SALT LAKE CITY UT 84115 801 485-8400

ABSTRACT

The Keystone Wallace produced water disposal facility (Site) is located approximately 25 miles southeast of Moab in the Lisbon Valley. The Site consists of a small open pit copper mine surrounded by tailings piles and a pond area consisting of a series of ponds treading north-south with each pond increasing in size and decreasing in elevation toward the south. The ponds were reportedly used in a metals leaching process and have not been active for at least two decades. The upper portion of one of these ponds (the "Brine Pond") has been bermed off to form two sludge ponds used to contain "produced water" from petroleum exploration drilling operations. CTC-Geotek has conducted a limited environmental investigation of the Site. Contamination has been assessed in soils, surface water, and groundwater.

The leaching potential of soils in contact with the tailings piles was evaluated. Leachate from these samples contained concentrations below the maximum EPA toxicity characteristic concentrations and therefore would not be considered "hazardous waste" according to the 1990 Federal Register pp. 11845-6 and 40 CFR 261.23.

The pond area was investigated with a series of soil borings and groundwater monitoring wells combined with sampling/analyses of soils, surface water, and groundwater.

Results indicate soils have not been significantly impacted by petroleum hydrocarbons except in the immediate vicinity of the sludge ponds. Sludge from the ponds was determined to consist of 90% TPH. Soil approximately one foot below the sludge contained 20 ppm benzene and 215.5 ppm total BTEX.

Laboratory analyses of the priority pollutant inorganics (PPI-metals) and Resource Conservation and Recovery Act (RCRA) 8-metals in soils show significant levels of these constituents in the vicinity of the sludge ponds and the two larger ponds downgradient of the Brine Pond. Tested soils did not contain significant levels of volatile organic compounds (VOCs) with the exception of petroleum hydrocarbons.

Water samples were tested for petroleum hydrocarbons, VOCs and metals. Results show significant levels of benzene in both surface water and groundwater in the vicinity of the sludge ponds. Benzene (15 ppb) was detected in groundwater sampled from MW-1 located approximately 400 feet downgradient of the sludge pond. Water samples collected from the Brine Pond and KW-1, KW-3 and KW-4 contained chromium concentrations in excess of the Federal and State MCL. Metals concentrations in water from the Brine Pond and KW-4 also exceeded MCLs for copper and silver. Sampled Site water apparently has not been significantly impacted by VOCs with the exception of benzene.

It is our understanding that the consequences of metals contamination will be considered on a case-by-case basis by Utah State regulatory agencies. Petroleum hydrocarbon levels exceed Utah State Recommended Cleanup Levels (RCLs) for soil and the Maximum Contaminant Level (MCL) for benzene in water. According to Federal Rule 40 CFR 261.4 and State Rule R315-3 "drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil. . . " are exempt as "hazardous waste". The observed petroleum hydrocarbon contamination is a consequence of such "produced waters" in the sludge ponds and the Brine Pond.

In spite of this exemption, it is our opinion that petroleum hydrocarbon contamination, specifically benzene, is the most mobile contaminant at the Site and poses the highest risk to human health and the environment. In accordance with discussion with Mr. David Knutson, Grand County Commission Chairman, it may be in the best interests of all concerned to prevent further degradation of the groundwater by remediating hydrocarbon contaminated soil at the Site. This may hopefully be accomplished without the permitting and additional expense required of facilities that do not have an exempt status.

4.3 Pond Area (Water)

Groundwater Monitoring Wells

Soil borings KW-1, KW-2, KW-3 and KW-4 were completed as groundwater monitoring wells to evaluate shallow groundwater quality and direction of flow. Wells were constructed of 2-inch diameter, schedule 40 PVC pipe with a 10 foot section of 0.02" well-screening in the bottom of each well. Specific well constructions are detailed in Appendix C. Well locations are illustrated in Figure 4, Appendix A.

Existing wells were gauged on March 26 and March 28, 1992 and surveyed to determine water depths and the direction of groundwater flow (Appendix C). The tops of the well casings were surveyed relative to the top of the KW-1 well casing which serves as a local benchmark. Well dimensions and groundwater measurements are presented in Table 4.

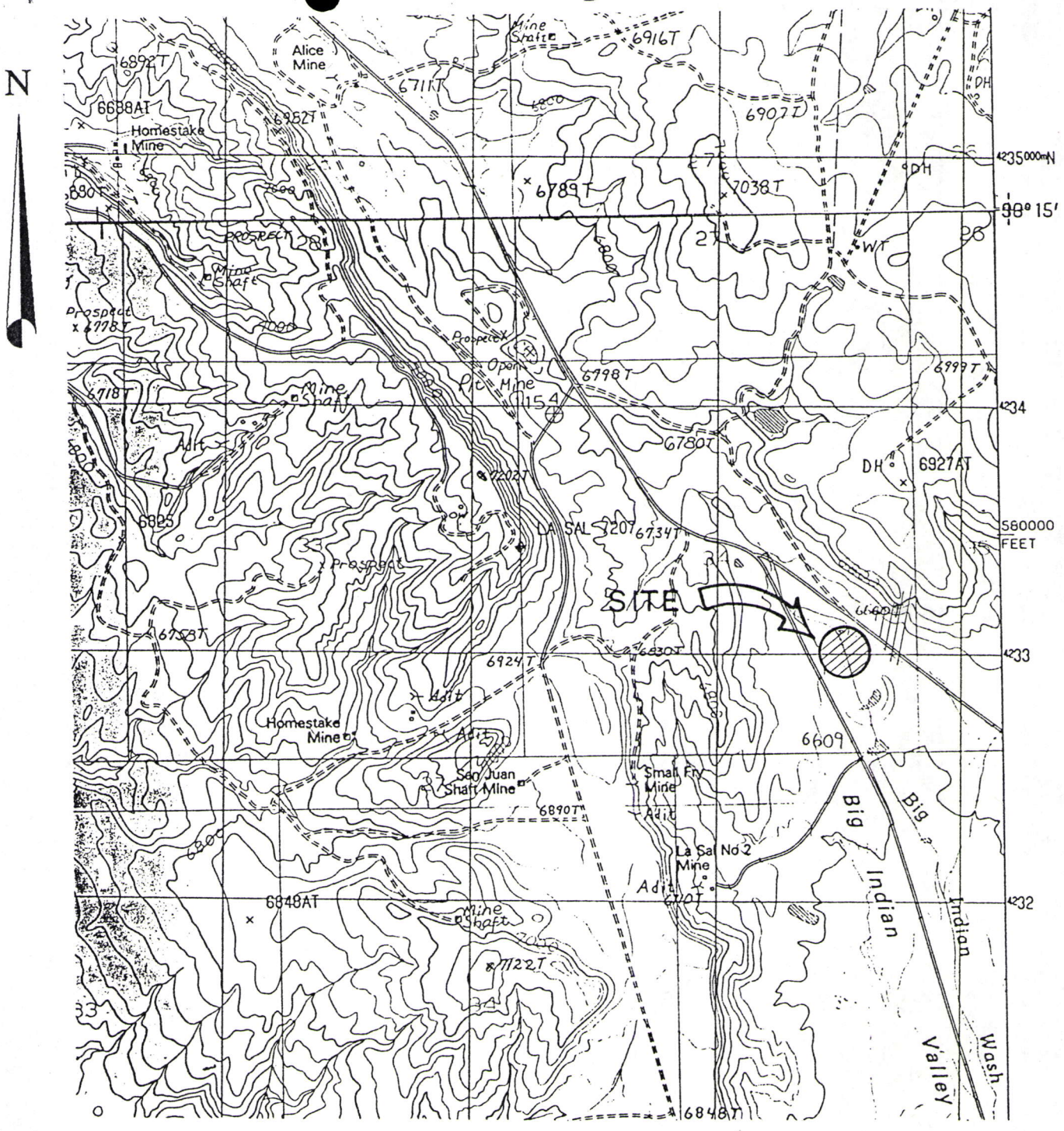
Table 4
Summary of Well Completions and Measured Water Levels[1]

Well No.	Total Depth (ft)	Screened Depth (ft)	Reference Elevation[2] (TOC in ft)	Groundwater Depth (ft)[3] 3/28/1992	Groundwater Elevation (ft)[4] 3/28/1992
KW-1	33	23-33	100.00	28.93	71.07
KW-2	34	24-34	97.88	30.77	67.11
KW-3	48	38-48	97.97	47.57	50.40
KW-4	14.8	4.8-14.8	95.18	7.69	87.49

[1]All elevations are relative to the top the KW-1 casing (bench mark)
[2]Reference elevation is top of well casing.
[3]Depth to groundwater measured from top of well casing on indicated date
[4]Relative elevations based on water depths measured on indicated date.

Results indicate the depth to groundwater is highly variable at the Site, ranging from 7.7 to over 47 feet. Data shows the potentiometric groundwater surface is mounded in the vicinity of KW-4 with groundwater flow direction being away from the well. The groundwater (potentiometric) surface and apparent flow directions are illustrated in Figure 5, Appendix A.

The apparent mounding is likely due to the infiltration of water from the Brine/sludge ponds. The extended areal groundwater flow direction is expected to be toward the southeast consistent with the flow direction of surface water in the Big Indian Wash.



KEYSTONE - WALLACE
SECTION 34, T. 29 SOUTH, R. 25 EAST
SAN JUAN COUNTY, UTAH

SITE VICINITY MAP

CTC-GEOTEK
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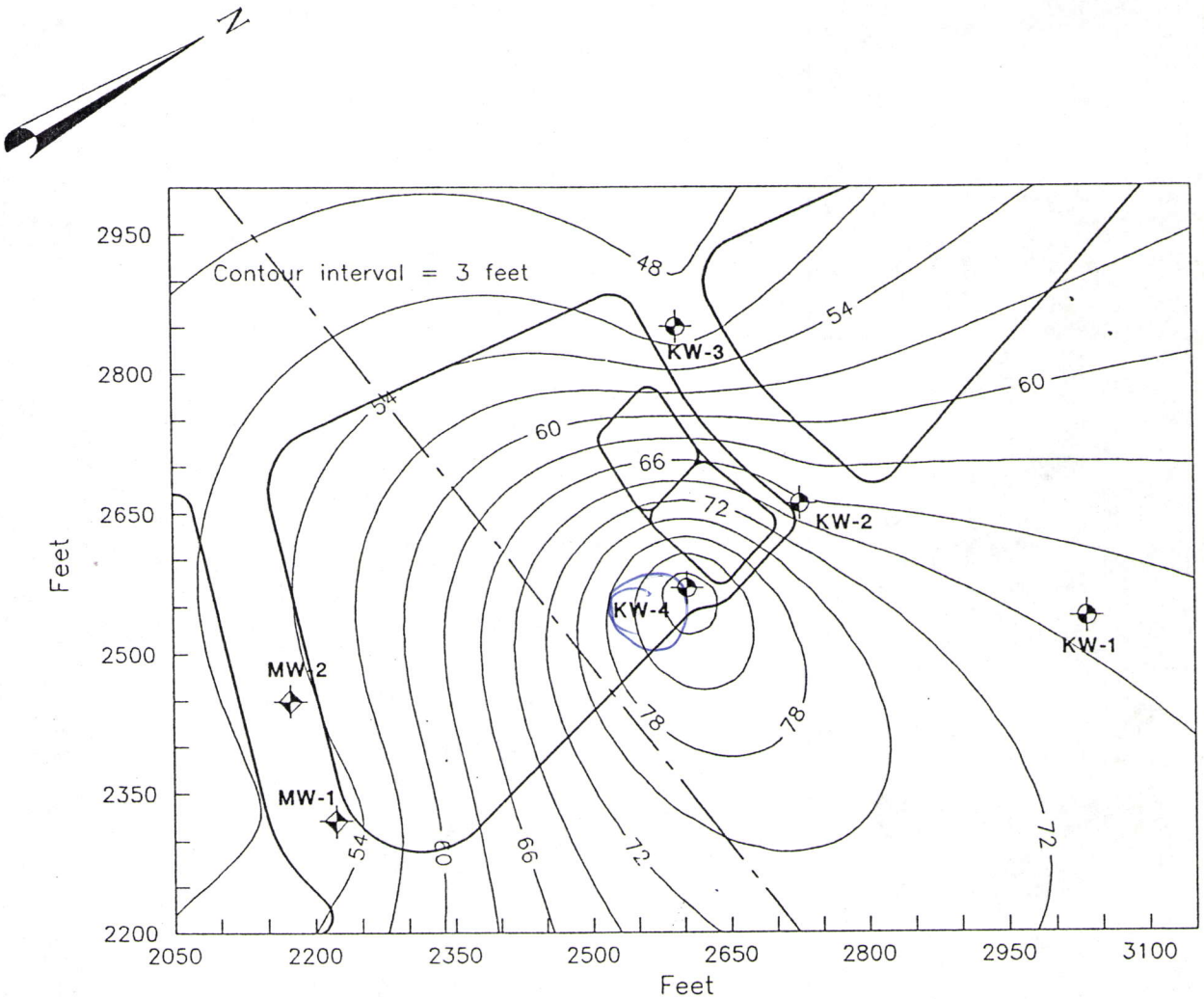
Drafted By: LVP Checked by: 7/22/1992	Job #142104	Scale 1"=2000'
	FIGURE 1	



LEGEND

- NEW MONITOR WELL
- EXISTING MONITOR WELL
- PROPERTY LINE

KEYSTONE - WALLACE BRINE PONDS

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POTENTIOMETRIC SURFACE MAP (APRIL 2, 1992)

DRAWN BY: M.K.H.	SCALE: Vertical 1" = 200' Horizontal 1" = 200'	
CHECKED BY: H.G.	JOB NO. 142104	FIGURE NO. 5
DATE: 12 MAY '92		

H04-04